



# First record of *Augastes lumachella* (Lesson, 1838) (Trochilidae) from the highest peak in northeastern Brazil

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## Abstract

This study records a new locality and elevational record for the Near Threatened Hooded Visorbearer, *Augastes lumachella* (Lesson, 1838). The record was made at the highest peak in northeastern Brazil, Pico do Barbado, near Catolés within the municipality of Abaíra (Bahia). Our record increases the elevational range of *A. lumachella* by about 400 m and shows that this species was capable of taking refuge at higher elevations during interglacial periods, as the Pico do Barbado is the highest locality in its entire distributional range.

## Keywords

Abaíra, *campo rupestre*, Catolés, Hooded Visorbearer.

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## Introduction

The genus *Augastes* comprises only two species, *Augastes scutatus* (Temminck, 1824) and *Augastes lumachella* (Lesson, 1838), both of which are endemic to eastern Brazilian mountaintops with rocky fields that are known as *campo rupestre* (Vasconcelos 2008). *Augastes scutatus* occurs mainly in the southern and central portion of the Cadeia do Espinhaço, in Minas Gerais state, and was recently reported for southern Bahia (Vasconcelos 2008, Vasconcelos et al. 2012). In turn, *A. lumachella* is restricted to the northern portion of the same mountain range, in the Chapada Diamantina and adjacent mountains in Bahia state (Vasconcelos 2008).

Unlike *A. scutatus*, whose geographic distribution,

reproductive biology, and behavior have been studied (Vasconcelos et al. 2001; Costa and Rodrigues 2007; Rodrigues and Rodrigues 2011; Vasconcelos et al. 2012), *A. lumachella* is a poorly known species. Its geographic distribution was revised by Vasconcelos (2008) and a range extension was proposed by Souza et al. (2009). The conservation status of *A. lumachella* fits the Near Threatened (NT) category (Birdlife International 2016). Although some populations of *A. lumachella* are protected within the Chapada Diamantina National Park, the number of mature individuals is unknown and livestock farming and mining are ongoing threats for the *campo rupestre* habitats where this species occurs (Birdlife International 2016).

The *campo rupestre* has conventionally been rec-

ognized as a formation within the Cerrado bioregion (Simon et al. 2009; Fiaschi and Pirani 2009). However, several authors have recently emphasized that *campo rupestre* should be treated as a distinct ecosystem characterized by a high density of herbaceous and shrubby plants living in nutrient-poor soils (usually distributed above 900 m), peculiar species compositions, and high levels of species endemism (Alves et al. 2014; Fernandes 2016; Silveira et al. 2016; Mucina 2018). The core region of the *campo rupestre* is found in the Cadeia do Espinhaço, which extends from northern Bahia to southern Minas Gerais states (Alves et al. 2014). The Cadeia do Espinhaço in Minas Gerais and in Bahia are mainly surrounded by the Cerrado and Caatinga bioregions, respectively (Colli-Silva et al. 2019).

## Methods

The record of one specimen of *Augastes lumachella* was obtained during fieldwork on the highest peak in northeastern Brazil, the Pico do Barbado in the Catolés district of Abaíra municipality, Bahia. On 24 May 2019, a specimen was photographed in its natural environment (the southern portion of Pico do Barbado). The landscape consists of Precambrian rocky outcrops that date to around 500 mya and is exposed to pronounced seasonal drought, which drastically affects the vegetation (Zappi et al. 2003). The exposed rocks and crevices provide distinct microclimates for many plant species; the richest families in the area are Asteraceae, Leguminosae, and Melastomataceae (Zappi et al. 2003), but none of these families were reported to be visited or utilized by *A. lumachella* (Machado et al. 2007). The distribution map of *A. lumachella* was prepared using QGIS 3.4.6 (QGIS Development Team, 2019) based on the coordinates provided by Vasconcelos (2008) and Souza et al. (2009).

## Results

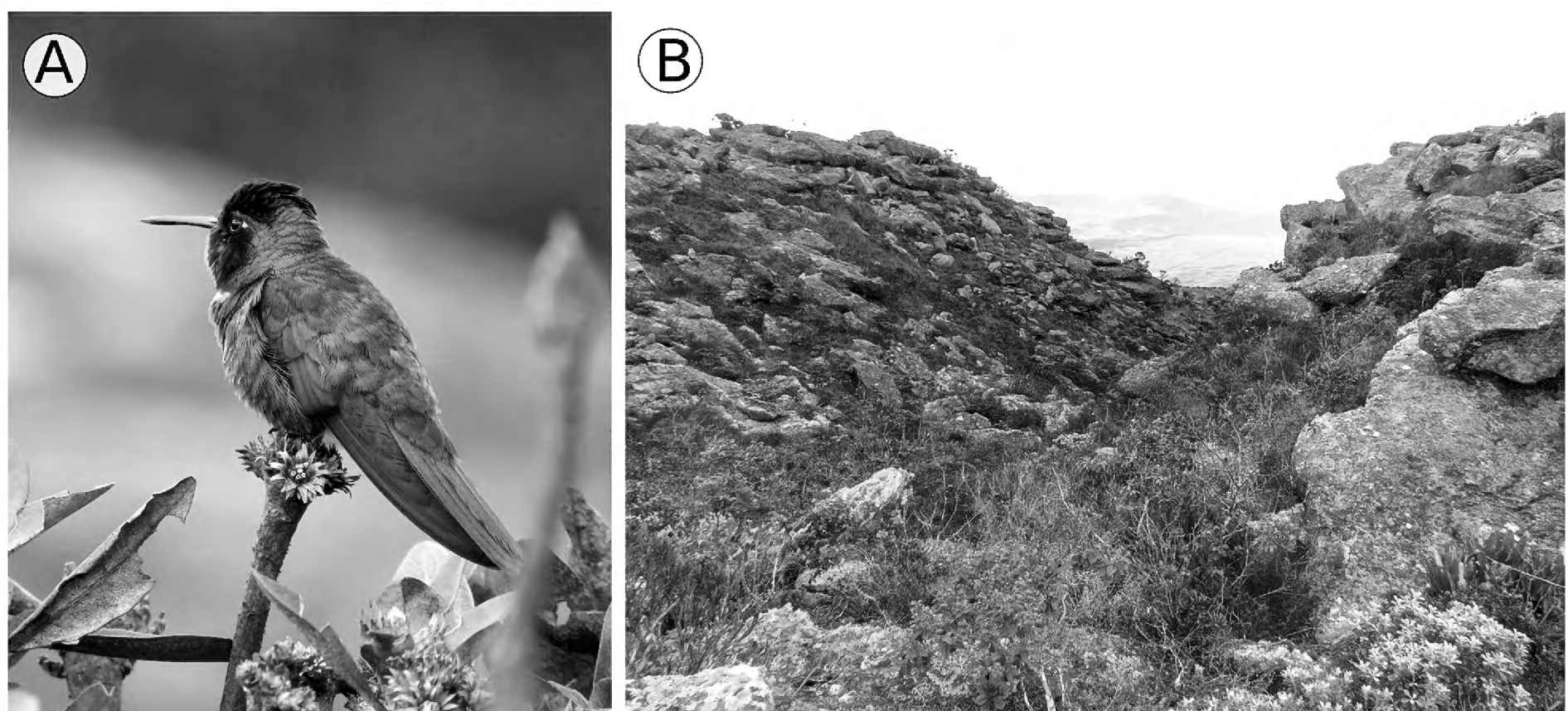
**New record.** Brazil. Bahia: municipality of Abaíra, district of Catolés, Pico do Barbado, (13°17'46.9"S, 041°54'25.9"W, about 2,033 m elev.), 24 May 2019, an adult male (Fig. 1A) in a *campo rupestre* site with rocky outcrops and low shrubby vegetation (Fig. 1B).

The photographic record of the specimen has been deposited on the WikiAves database site under catalog number WA3382033 (Pacífico 2019). The distribution of *A. lumachella* is presented in Figure 2.

**Identification.** *Augastes lumachella* can be recognized by its back and throat that are shining green, the crown blackish, the breast shining green with white bands on the upper sides and a small orange region with pink in the center, and the tail copper red (Sick 1993; Sigris 2009; Fogden et al. 2014). It differs from *A. scutatus* by the shining green breast (vs bluish green in *A. scutatus*) the small orange region with pink in the center (vs shining green) and tail greenish (vs copper red) (Sick 1993; Sigris 2009).

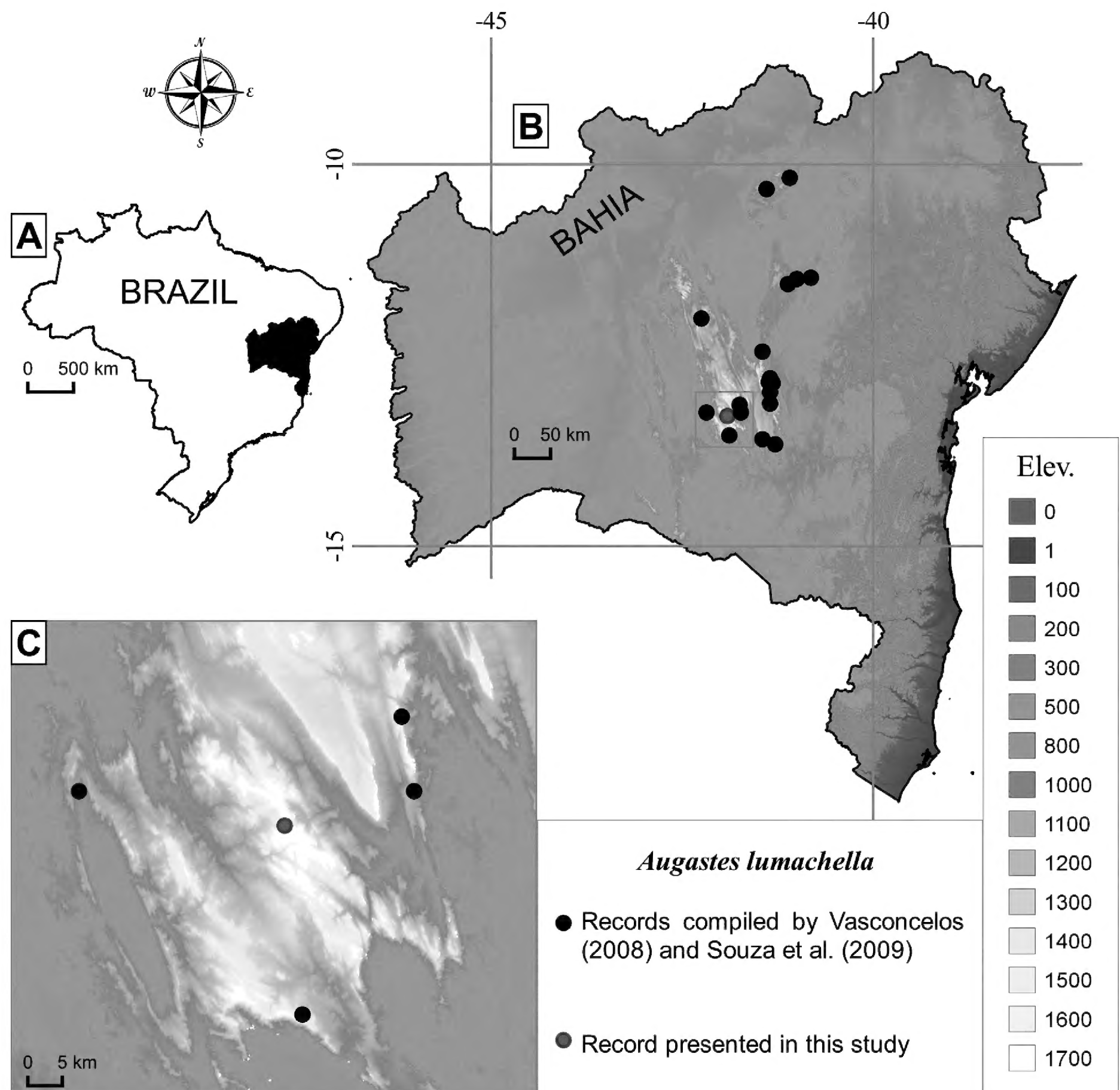
## Discussion

This note reports a new location for a little-known bird species endemic to *campo rupestre*, an ecosystem that has been neglected as a conservation priority (Silveira et al. 2016). This is the first report of *A. lumachella* in Abaíra municipality and may be useful for environmental management and conservation strategies for the region, as the Pico do Barbado also harbors a high diversity of plants (Zappi et al. 2003), including local endemics such as *Microlicia plumosa* Woodgyer & Zappi (Melastomataceae) and *Dichantherium barbadense* Salariato, Morone & Zuloaga (Poaceae) (Woodgyer and Zappi 2005; Salariato et al. 2011). Although it already has the status of Área de Proteção Ambiental (Environmental Protection



**Figure 1.** **A.** *Augastes lumachella* recorded at the Pico do Barbado, Catolés district, Abaíra municipality, Bahia, Brazil. **B.** *Campo rupestre* landscape on Pico do Barbado. (Photographs by R. Pacífico.)





**Figure 2.** Distribution of *Augastes lumachella*. **A.** Brazil with Bahia state highlighted. **B.** Records of *A. lumachella* in Bahia. **C.** Detail of the region around the new record in Southern Chapada Diamantina.

Area), certain types of agricultural activities are currently allowed in the Pico do Barbado region. Therefore, we hope that our finding increases the public appeal for the inclusion of the mountains around Abaíra in a strict conservation unit.

*Augastes lumachella* was previously reported only for elevations between 950–1,600 m (Sick 1993; Fogden et al. 2014; Birdlife International 2016). Our record increases the elevation range of *A. lumachella* by about 400 m (950–2,033 m), reaching a similar elevation range (900–2,000 m) of its sister species, *A. scutatus* (Birdlife International 2018).

*Augastes lumachella* and *A. scutatus* are believed to be allo-species (Vasconcelos 2008; Chaves et al. 2019). The divergence time of 2–4 mya estimated by Chaves et al. (2019) using DNA sequence data suggests that these two species originated from Late Pliocene to Early

Pleistocene. Their origin could be associated with an epeirogenic uplift of the Brazilian Plateau that occurred in the eastern half of Brazil, while Pleistocene climatic fluctuations probably have favored their temporal ecological specialization and population structuring (Chaves et al. 2019). Pleistocene climatic fluctuations would have forced populations of *A. lumachella* and *A. scutatus* to take refuge at higher elevations during interglacial periods (Vasconcelos et al. 2012). Our record provides evidence that *A. lumachella* is adapted to high elevations because the Pico do Barbado is the highest locality in its entire distributional range. This record agrees with the hypothesis that *A. lumachella* was at least capable of taking refuge at higher elevations during warmer climates.

The Cadeia do Espinhaço provided a striking setting that favored speciation for many endemic plants (Silveira et al. 2015), but just a few endemic birds (Vasconcelos

2008) compared with the Andean region (Fjelds  et al 2012). Five bird species are currently recognized as *campo rupestre* endemics in the Cadeia do Espinha o, i.e., *Asthenes luizae* (Vielliard, 1990), *Cinclodes espinhacensis* (Freitas, Chaves, Costa, Santos & Rodrigues, 2012), *Formicivora grantsau* (Gonzaga, Carvalhaes & Buzzetti, 2007), *A. scutatus*, and *A. lumachella* (Vasconcelos 2008; Vasconcelos et al. 2008; Freitas et al. 2012). The genus *Augastes* is remarkable because it consists of two allo-species with a unique evolutionary history (Vasconcelos et al. 2012; Chaves et al. 2015, 2019). Distributional data on *Augastes* have been employed to infer speciation events on eastern Brazilian mountaintops (Vasconcelos et al. 2012; Chaves et al. 2015, 2019) and may contribute to an understanding of South American biogeography.

The areas around Catol s are still underexplored scientifically and we hope this new record will encourage future research in the interior mountains of Bahia.

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## Authors' Contributions

RP and FA participated in the field trip to the Pico do Barbado and wrote the text. RP photographed the new record and prepared the map and figures.

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